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X-ray Spectroscopy of Plasmas on the Z Accelerator P. DAVID LEPELL, Ktech Corp., CHRISTINE COVERDALE, BRENT JONES, CHRIS DEENEY, SNL, JOHN APRUZESE, NRL, ALLA SAFRANOVA, NICK OUART, UNR — Tests on the Z-accelerator have been performed to optimize the K-shell emissions from aluminum, stainless steel and copper wire arrays. This process entails changing the array's initial diameter, wire number, or wire thickness, and is influenced by considerations of final implosion velocity and initial mass. Measurements of the plasma temperature and density provide important benchmarks for modeling and theoretical studies, but they can also provide important feedback to experimentalists. If H-like lines dominate the spectrum the plasma is clearly overheated, and mass can be added to the plasma without a significant temperature penalty. We will show examples of K-shell spectra (and where available, L-shell spectra) generated by the Z-machine, and how these spectra reflect array-design considerations. In addition we will show recent data from a stainless steel array where both time- and space-resolved spectra were captured, and examples of parameters that can be extracted: plasma size, temperature and density. All together, these measurements can provide insight into the dynamic process responsible for these final states.

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